
Appendix A: POST diagnostics

Power On Self Test (POST) diagnostics run when you power on or reset the system. POST diagnostics initialize the system, set interrupt vectors, detect installed peripheral devices, and boot the operating system.

During the test, POST displays the amount of memory accessed and tested.

Table A-1
POST and related processes

Action/Message	Description
If POST Beeps before Video Appears	Initialization failed before video initialized. Most Beep code errors are fatal; initialization cannot continue.
If Monitor Displays Error	Record error; press <Esc> to continue boot or <F1> to enter BIOS Setup.
To Enter BIOS Setup	Press <F1> during initialization to run the Setup utility. If you do not press <F1>, the boot process continues. Use the Setup Utility before using the System Configuration Utility (SCU) to enable the diskette drive and after using SCU to make specific changes. Setup changes specific options, then writes to CMOS, NVRAM.
To Enter SCSI Select	Press <Ctrl-A> during memory test to run SCSI Select. If you do not press <Ctrl>, the boot process continues. Use SCSI Select utility before using the System Configuration Utility (SCU) to enable the diskette drive, and after using SCU to make specific changes. Setup changes specific options, then writes to CMOS, NVRAM.
To Enter SCU	Insert SCU diskette before system boots.
POST Beeps	Initialization has completed.

Hot keys

The following table lists the key combinations you can use while POST is running.

Table A-2
POST hot key combinations

Key sequence	Description
<Ctrl-Alt-Del>	System software reset. Reruns POST.
<Ctrl-Alt-2>	Enables turbo mode. System runs at rated speed of CPU.
<Ctrl-Alt-1>	Disables turbo mode.
<Ctrl-Alt-S>	Secure mode, only if password is enabled in SCU. Disables mouse and keyboard.

Security

The following table lists security considerations for IVR 2.0/I.

Table A-3
Security events

Activating event	Setup
Power on or reset	Requires setting User password and enabling Secure Boot Mode in SCU. The system prompts for your password.
Hot Key sequence	Requires setting User password and enabling Hot Key Option in SCU.
Specified time expires	Requires setting User password and Inactivity Timer Function in SCU.

System reset

POST diagnostics will run whenever the system is reset.

The following table lists methods you can use to reset the MIVR 2.0/I Application Processor.

Table A-4
Reset activators

Keys	Action
<Ctrl+Alt+Del>	Soft boot clears system memory and reloads operating system.
Reset button	Clears system memory, restarts POST, and reloads operating system.
Power on/off button	Cold boot has same effect as reset button, except power is halted to all peripherals.

POST error and signal codes

When you power up or reboot the Application Processor, POST displays informational messages about system components.

This section describes the following error beep codes and screen messages of the Magellan/Altair system:

- POST Beep Codes
- POST Error Codes and Messages
- Countdown Codes displayed during normal BIOS POST

When POST displays an error message, the speaker beeps twice before the message appears.

POST beep codes

If an error occurs before video initialization, POST emits beep codes that indicate errors in hardware, software, or firmware.

A beep code is a series of separate tones, each equal in length. Write down the beep codes before calling Nortel Service.

Most POST Beep Codes are fatal and indicate that you should replace your baseboard.

Table A-5
POST Beep Code descriptions

Beeps	Error Message and Conditions
1	Refresh failure; memory refresh circuitry on baseboard is faulty
2	Parity error; parity error in first 64 Kbyte memory
3	Base 64Kbyte memory failure; memory failure in first 64 Kbyte memory
4	Timer not operational; timer on baseboard not operational or memory failure in first 64 Kbyte memory
5	Processor error; CPU on baseboard generated an error

Table A-5
POST Beep Code descriptions (Continued)

Beeps	Error Message and Conditions
6	8042 gate a20 failure; BIOS cannot switch to protected mode
7	Processor exception interrupt
8	Display memory read/write error; system video adapter is missing or its memory is faulty (not a fatal error)
9	ROM checksum error; ROM checksum value does not match encoded value in BIOS
10	CMOS shutdown register read/write error; shutdown register for CMOS RAM failed.

POST codes and countdown codes

The BIOS indicates the current stage of POST after the video adapter has been successfully initialized. A two-digit hex code is sent to I/O location 80h, and is shown on an LED display if a Port 80h card is installed.

The current countdown code is displayed on the LCD panel once it is initialized.

The following sections outline the Recovery and Normal port-80 codes and countdown codes.

Recovery port-80 codes and countdown codes

The following table lists the port-80 codes and POST countdown codes that are displayed during the recovery boot process.

Table A-6**Recovery port-80 codes and countdown codes**

Port-80 codes	Countdown codes	Reason
02h	..	Disable internal cable
08h	..	Disable DMA controller #1, #2, disable interrupt controller #1, #2, reset video display
13h	..	Init all chipset registers (enable LCD display here)
15h	900	Initialize system timer
1Bh	800	Real mode base 64Kbyte test
20h	700	16k base RAM test
23h	650	Set up interrupt vectors
40h	600	Test memory in virtual mode
65h	500	Initialize 8237 DMA controller
67h	400	8259 interrupt controller test
80h	300	Unmask diskette, kb and timer interrupts
88h	200	Floppy unit initialization
A0h	100	Cache enable
00h	000	Boot OS

Normal port-80 codes and countdown codes

The following table lists the port-80 codes and countdown codes displayed during the normal BIOS POST process.

Table A-7
Normal port-80 codes and countdown codes

Port-80 codes	Countdown codes	Reason
D0h	..	Returned from ResetInit
D1h	..	Power On Init
D2h	..	Returned from Power On Init
D3h	..	Soft Reset Entry Point
D4h	..	Test if in Protected mode (entered from POST.BIN)
D5h	..	Checksum only the LOADER.BIN
D6h	..	Loader.BIN checksum good (enable LCD in Init Before KBC Init)
D7h	900	Issue BAT command to KBD controller
D8h	..	After waitForEmptyBuffer
D9h	..	After Empty8042InputBufferX
DAh	..	After Retrieve8042OutputBufferX
Dbh	820	Keyboard Init Passed
DDh	..	After initAfterKBCInitEnd
DFh	..	2nd Empty8042InputBufferX
E0h	780	Initialize Master/Slave PICs
E1h	..	Before ChipsetInitEnd
E2h	..	After ChipsetInitEnd
E3h	760	Initialize timer channel 0 for system timer

Table A-7
Normal port-80 codes and countdown codes (Continued)

Port-80 codes	Countdown codes	Reason
E4h	..	Before beginning memory test, need to clear any pending parity errors
E6h	740	Test RAM from 0–640KB
E7h	..	GetMinPartitionSizeX
E8h	..	RAM failure, call RemapMemoryPartitionX
E9h	..	RAM test complete, passed
Eah	730	Set up stack at 30:100
EBh	..	BIOS just shadowed
Ech	..	Make F000h DRAM R/W Enabled
EDh	..	Dispatch POST
23h	700	Setup interrupt vectors
24h	..	Just after call to SetPostEnvironment
0Dh	..	CustomCheckManufacturingMode and CheckDefaultJumper
0Eh	690	Check validity of CMOS
0Fh	..	Force CMOS defaults
10h	..	CMOS init complete
25h	..	After initialize CMOS pointers in EBDA
F0h	600	EISA slot initialization
F1h	..	Enable extended NMI sources
F2h	..	Text extended NMI sources
28h	..	Set monochrome mode
29h	..	Set color display

Table A-7
Normal port-80 codes and countdown codes (Continued)

Port-80 codes	Countdown codes	Reason
2ah	..	Clear parity status if any
2bh	..	call ChipsetBeforeVideoInit
2ch	580	Video option ROM search
2dh	..	call CustomAfterVideoInit
2eh	570	After video init
2fh	560	After mono display setup
30h	..	Before check for vertical retrace
31h	..	Test for color display memory
32h	..	Check for vertical retrace
34h	..	Video card detected
35h	520	Initialize Console Redirection
36h	..	InitializeMessagingServices and ClearScreen
37h	500	CustomDisplaySignon
F3h	..	EisaErrorDisplay
80h	370	KB/mouse port check
81h	..	Keyboard error determination
82h	..	Enable Keyboard Interrupts and init kbd circular buffer
83h	..	Check if keyboard is locked
F5h	330	Initialize mouse

Table A-7
Normal port-80 codes and countdown codes (Continued)

Port-80 codes	Countdown codes	Reason
39h	..	CustomUpdateScreenPointers, CustomDisplaySetupMessage, CustomDisplayKeyboardSignon, CustomDisplayMouseSignon
3bh	..	Jumps to 'StartMemoryTesting' in next module
43h	290	call GetMinPartitionSizeX
4Fh	..	call DisableEnhancedPost
52h	..	call ChipsetAdjustMemorySize
61h	250	DMA register tests
62h	..	DMA test OK
64h	..	DMA controller F/F latch test
65h	..	Initialize 8237 DMA controller
66h	..	clear DMA write request reg and mask set/reset reg
67h	220	8259 Interrupt controller test
F4h	..	Enable extended NMI sources
8Ch	140	Chipset@Devinit and ConfigurePeripheralController
8Fh	130	Floppy init
91h	120	HD init
92h	..	set printer, rs-232 time out
96h	..	Before Option ROM scan
97h	080	Option ROM scan C800h-E000h
98h	..	After Option ROM scan

Table A-7
Normal port-80 codes and countdown codes (Continued)

Port-80 codes	Countdown codes	Reason
9Ah	..	soft reset (1234) --> (1200)
9Dh	070	time data area initialization
A0h	..	printer setup
A1h	..	rs_232 setup
A2h	..	After KB circular buffer set up
Abh	..	Before NPX test and init
Ach	060	NPX test and init
ADh	..	update coprocessor info in CMOS and recalculate checksum
Aeh	..	Set typematic rate
Afh	050	KBD read ID command
B0h	..	Wait for READ ID response
A3h	..	Display POST errors
A6h	..	Before Setup
A7h	030	Call Setup
B1h	..	Enable Cache for boot
B3h	..	Setup display mode set
B4H	..	Jmp preos.asm
BBh	020	Start of PreOS
00h	000	Execute BOOT
End		

POST error codes and messages

The BIOS indicates errors two ways:

- writing an error code to the logging area in the Extended BIOS Data Area
- displaying a POST error code and a message on the screen.

The following chart lists the onscreen POST error codes and messages.

Table A-8
Onscreen POST codes and messages

Code	Error message
0002	Primary Boot Device Not Found
0010	Cache Memory Failure, Do Not Enable Cache
0015	Primary Output Device Not Found
0016	Primary Input Device Not Found
0041	EISA ID Mismatch for Slot
0043	EISA Invalid Configuration for Slot
0044	EISA config NOT ASSURED
0045	EISA Expansion Board Not Ready in Slot
0047	EISA CMOS Configuration Not Set
0048	EISA CMOS Checksum Failure
0049	EISA NVRAM Invalid
0060	Keyboard Is Locked...Please Unlock It
0070	CMOS Time & Date Not Set
0080	Option ROM has bad checksum
0083	Shadow of PCI ROM Failed
0084	Shadow of EISA ROM Failed
0085	Shadow of ISA ROM Failed

Table A-8
Onscreen POST codes and messages (Continued)

Code	Error message
0131	Floppy Drive A:
0132	Floppy Drive B:
0135	Floppy Disk Controller Failure
0140	Shadow of System BIOS Failed
0170	Disabled CPU slot #
0171	CPU Failure - Slot 1, CPU # 1
0172	CPU Failure - Slot 1, CPU # 2
0173	CPU Failure - Slot 2, CPU # 1
0174	CPU Failure - Slot 2, CPU # 2
0171	Previous CPU Failure - Slot 1, CPU # 1
0172	Previous CPU Failure - Slot 1, CPU # 2
0173	Previous CPU Failure - Slot 2, CPU # 1
0174	Previous CPU Failure - Slot 2, CPU # 2
0175	CPU modules are incompatible
0180	Attempting to boot with failed CPU
0191	CMOS Battery Failed
0195	CMOS System Options Not Set
0198	CMOS Checksum Invalid
0289	System Memory Size Mismatch
0295	Address Line Short Detected
0299	ECC Error Correction failure
0301	ECC Single bit correction failed, Correction Disabled
0302	ECC Double bit Error

Table A-8
Onscreen POST codes and messages (Continued)

Code	Error message
0310	ECC Address failure, Partition #
0370	Keyboard Controller Error
0373	Keyboard Stuck Key Detected
0375	Keyboard and Mouse Swapped
0380	ECC SIMM failure, Board in slot 1 SIMM #
0392	ECC SIMM failure, Board in slot 2 SIMM #
0430	Timer Channel 2 Failure
0440	Gate-A20 Failure
0441	Unexpected Interrupt in Protected Mode
0445	Master Interrupt Controller Error
0446	Slave Interrupt Controller Error
0450	Master MA Controller Error
0451	Slave DMA Controller Error
0452	DMA Controller Error
0460	Fail-safe Timer NMI Failure
0461	Software Port NMI Failure
0465	Bus Timeout NMI in Slot
0467	Expansion Board NMI in Slot
0501	PCI System Error
0510	PCI Parity Error
0710	System Board Device Resource Conflict
0711	Static Device Resource Conflict
0800	PCI I/O Port Conflict

Table A-8
Onscreen POST codes and messages (Continued)

Code	Error message
0801	PCI Memory Conflict
0802	PCI IRQ Conflict
0803	PCI Error Log is Full
0810	Floppy Disk Controller Resource Conflict
0811	Primary IDE Controller Resource Conflict
0812	Secondary IDE Controller Resource Conflict
0815	Parallel Port Resource Conflict
0816	Serial Port 1 Resource Conflict
0817	Serial Port 2 Resource Conflict
0820	Expansion Board Disabled in Slot
0900	NVRAM Checksum Error, NVRAM Cleared
0903	NVRAM Data Invalid, NVRAM Cleared
0905	NVRAM Cleared by Jumper
0982	I/O Expansion Board NMI in Slot
0984	Expansion Board Disabled in Slot
0985	Fail Safe Timer NMI
0986	System Reset caused by Watchdog Timer
0987	Bus Timeout NMI in Slot
End	